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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,888	11/13/2006	Hiroyuki Tsuda	060247	9923
23850 7590 03/14/2008 KRATZ, QUINTOS & HANSON, LLP 1420 K Street, N.W. Suite 400 WASHINGTON, DC 20005				
EXAMINER				
LAM, HUNG Q				
ART UNIT		PAPER NUMBER		
2883				
MAIL DATE		DELIVERY MODE		
03/14/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/573,888

Applicant(s)

TSUDA, HIROYUKI

Examiner

HUNG LAM

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date 01/23/2008
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Inventor's Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of the Application

Claim 11 is added.

Claims 1-7 and 9-11 are pending.

Claim 8 was canceled by preliminary amendment.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on January 23, 2008 was filed in compliance with the provisions of 37 CFR 1.97. The examiner has considered the information disclosure statement.

Response to Argument

1. Applicant's arguments filed on December 10, 2007 have been fully considered but they are not persuasive for the following reasons:
2. In reference to the arguments regarding claims 1 and 11, the examiner respectfully agrees with the applicant's argument that electrode C of **Nilsson et al.** is used for electro optical effect ant the temperature control (i.e. heater means). However, the only motivation of using this reference is the teaching of placing electrodes between pluralities of grooves/slots/trenches structure provide along the optical path, then ones with ordinary skill in the art would using that idea to locally and directly control the filling material in the grooves by meaning of either electro optical effect or thermal optical effect. Please see applicant cited reference to Clapp et al. (U.S. Pat. 6,459,533) which comprises a heater electrodes means (i.e. figure 1 and figure 6) , which has a similar electrode structure (i.e. electrodes 19 and electrodes 21) that can be applied in either

electric field effect or thermo-optic effect. Therefore, **Nilsson et al.** provides a good motivating/teaching reference in combination with **Kamei et al.**

3. Moreover, the examiner respectfully disagrees with the applicant's argument that the rejection should be withdrawn because "**Nilsson et al.** do not represent a single alternating S-shaped arrangement". Again, as stated above **Nilsson et al.** is only used in combination with **Kamei et al.** for providing electrode pattern between grooves for grooves' controlling means (i.e. electro or thermo-optical effect). For the limitation of "alternating S-shaped arrangement", **Deacon** teaches a heater trace/electrode 160 which may have other patterns known in the art such as photo resist patterns or serpentine/snake pattern which is equivalent to "S-shaped arrangement". Therefore, the references above in the combination as proposed render obvious the claimed limitation of claims 1 and 11.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

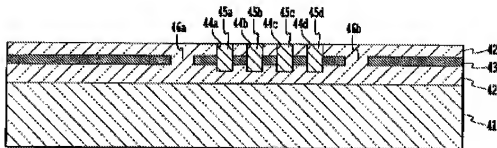
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kamei et al.** (US. Pub. 2004/0126052) and **Nilsson et al.** (US. Pat. 5,438,637) further in view of **Deacon** (US. Pat. 6,373,872).

Regarding claims 1 and 11, Kamei et al. disclose an optical functional waveguide circuit comprising:

- a cladding layer 42 formed on a substrate 41, a core 43 which is formed in said clad and serves as an optical waveguide/path ([0190], and Fig. 29B);
- a plurality of groove structures 44a-44d formed so as to align at a predetermined interval along the optical waveguide/path 43 and fragmentize the optical waveguide/path 43 and being filled with a material having a refractive index temperature coefficient different from that said core 43([0189], [0192], Fig. 29B).

FIG.29B



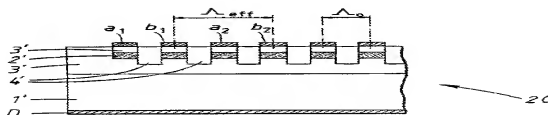
Reproduced from US. Pub. 2004/0126052.

Kamei et al. only disclose that filled material in the grooves is effected by heat (temperature), Kamei et al, however, do not explicitly disclose a heater or a heater electrode interposed between said plurality of groove structures provided along the optical path in an alternating S-shaped arrangement.

Nilsson et al. teach an electrically controllable filter device having a fragmented optical waveguide 2' with plurality of periodic groove structures 4' that filled with a semi-conducting material or oxide wherein a electrode structure A, B is interposed between said plurality of

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groove structures 4' provided along the fragmented optical waveguide 2' (col. 4 lines 20-40, and Fig. 3b).

**FIG. 3b**

Reproduced from US. Pat. 5,438,637.

Further, **Deacon** teaches a thermo-optically tuned grating reflector having an intracavity grating waveguide structure 122 wherein the material in a grating region/segment 130 of the intracavity waveguide 122 have a substantial thermal coefficient that is controlled by a strip pattern heater trace/electrode 160. The heater trace/electrode 160 may have other patterns known in the art such as photo resist patterns or serpentine/snake patterns that disposed over the grating region 130 of the intracavity waveguide 122 (col. 15 lines 2-4 and 32-35).

It would have been obvious to the one having ordinary skill in the art at the time the invention was made to apply the teachings of **Nilsson et al.** in **Kamei et al.** as to provide a heater's electrode patterns over along the groove structures of the optical path. The motivation for doing so is for providing heater source with heater electrode arrangement to the groove structures since this heater traces comprising an electrode arrangement that easy to modify and "have low resistance to reduce unwanted power consumption" (Deacon, col. 16 lines 1-5).

Moreover, it would have been obvious to the one having ordinary skill in the art at the time the invention was made to use the teachings of the serpentine (snake or photo resist patterns) heater electrode patterns of **Deacon** to modify **Kamei et al.** and **Nilsson et al.** by

providing a heater electrode that being interposed between said pluralities of groove structures provided along the optical path in an alternating S-shaped arrangement. The motivation for doing so is for optimized the temperature distribution fast and effectively to each individual groove in the groove structures, since this electrode structure “is simple and cheap to fabricate” plus such “a device with a great flexibility and which can be varied in a number of different ways” (Nilsson et al, col. 2 lines 1-10).

Regarding claims 2 and 3, in accordance with the rejection of claim 1, **Kamei et al.** and **Deacon** modified by **Nilsson et al.** further disclose that pluralities of groove structures are lens-shaped, therefore, at least one of the end faces of said pluralities of groove structures is tilted from a position perpendicular to the optical path (Deacon, Fig. 40)

Regarding claims 4 and 5, **Kamei et al.** and **Deacon** modified by **Nilsson et al.** further disclose that an optical modulator comprising the optical functional waveguide according to claim 1 which modulates the phase of light since “the grating interaction may be changed by a distributed thermally induced phase shift as a function go the heater current” (col. 12 lines 8-18 and col. 16 lines 13-15); and an arrayed waveguide grating 552 comprising the optical functional waveguide according to claim 2 in a slab waveguide 553 (Kamei et al, [0316], and Fig. 42).

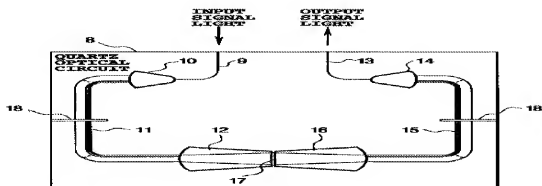
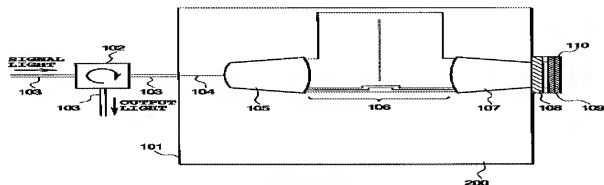
Regarding claim 9, in accordance with the rejection of claim 1, **Kamei et al.** and **Deacon** modified by **Nilsson et al.** further disclose that groove structure 418a-n is provided at a slab waveguide of a coupling portion of the slab waveguide 413a and a single mode waveguide 414a (Kamei et al, [0291]-[0294], and Fig. 39-40).

Regarding claim 10, in accordance with the rejection of claim 1, **Kamei et al.** and **Deacon** modified by **Nilsson et al.** further disclose that pluralities of groove structures are wedge-shaped (Deacon, Fig. 32).

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kamei et al.** and **Deacon** modified by **Nilsson et al.** and further in the view of **Kurokawa et al.** (US. Pat. 6,122,419).

Regarding claims 6 and 7, in accordance with the rejection of claim 2, **Kamei et al.** and **Deacon** modified by **Nilsson et al.** further disclose the claimed invention except for a dispersion compensation circuit comprising the optical functional waveguide according to claim 2 in the vicinity of a coupling portion that two arrayed waveguide grating are coupled to each other in a cascade, and a mirror provided in a waveguide and arranged in the vicinity of a spectrum plane wherein the optical functional waveguide according arranged in the vicinity of said mirror.

Kurokawa et al. teach a dispersion compensation circuit comprising mirror 110 attached to waveguide of slab waveguide 107 of arrayed waveguide grating 200 and arranged in the vicinity of a plane that produce reflecting spectrum where the slab waveguide 107 is attached to that vicinity (col. 24 lines 32-45, col. 30 lines 2-3, and Fig. 20); and **Kurokawa et al** also disclose a coupling portion 17 a rewritable pattern glass substrate that two array waveguide grating 11 and 15 are coupled to each other in series (col. 21 lines 1-28, and Fig. 10).

**FIG. 10****FIG. 20**

Reproduced from US. Pat. 6,122,419.

It would have been obvious to the one having ordinary skill in the art at the time the invention was made to combine these teachings above of **Kurokawa et al.** and using them to modify the device of **Kamei et al.** and **Deacon** modified by **Nilsson et al.** by incorporating the optical functional waveguide to a coupling portion of a dispersion compensation circuit that enable two arrayed waveguide gratings are coupled in series, and further also including a mirror which is provided in a waveguide of the optical functional waveguide that arrange in the vicinity of a plane that produces the reflection spectrum. The motivation for doing so is "to distribute the incident light on a straight line and making desired amplitude or phase modulation of the light according to the position on the straight line and reflecting the light" and it is possible to control

the dispersion compensation amount of a requirement (Kurokawa et al. "abstract", and col. 3 lines 6-9).

Conclusion

Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Lam whose telephone number is 571-272-9790. The examiner can normally be reached on M - F 07:30 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Hung Lam/
Assistant Examiner, Art Unit 2883

/Frank G Font/
Supervisory Patent Examiner, Art Unit 2883

March 3, 2008
FGF/hl